SANITARY COMMISSION.

0.

REPORT

OF A

COMMITTEE OF THE ASSOCIATE MEDICAL MEMBERS OF THE SANITARY COMMISSION

ON THE SUBJECT OF

THE TREATMENT

OF

FRACTURES IN MILITARY SURGERY.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1862.

THE attention of the Sanitary Commission has been directed to the fact that most of our Army Surgeons, now in the field, are unavoidably deprived of many facilities they have heretofore enjoyed for the consultation of standard medical authorities. It is obviously impossible to place within their reach anything that can be termed a medical library. The only remedy seems to be the preparation and distribution among the medical staff, of a series of brief essays or hand-books, embodying in a condensed form the conclusions of the highest medical authorities in regard to those medical and surgical questions which are likely to present themselves to surgeons in the field, on the largest scale, and which are, therefore, of chief practical importance.

The Commission has assigned the duty of preparing papers on several subjects of this nature, to certain of its associate members, in our principal cities, belonging to the medical profession, whose names are the best evidence of their fitness for their duty.

The following paper on "The Treatment of Fractures in Military Surgery" belongs to this series, and is respectfully recommended by the Commission to the medical officers of our army now in the field.

FRED. LAW OLMSTED,

WASHINGTON, Dec. 6th, 1861. *Secretary.*

ON THE TREATMENT

OF

FRACTURES IN MILITARY SURGERY.

In military practice, peculiar difficulties are apt to exist in the treatment of fractures; so that the surgeon is sometimes obliged to amputate limbs which he might in civil life hope to save. These difficulties arise either from the want of suitable or adequate apparatus, or from the unfavorable conditions of the case; as on the field of battle, on the march, or wherever the patient must be transported any distance before finding the rest and quiet so essential to his comfort or even safety. It has therefore been thought by the Sanitary Commission that some hints upon this branch of surgery, and especially upon the expedients which may be resorted to in emergencies, might prove useful to those engaged in the army medical service.

MATERIALS FOR SPLINTS, ETC.

A supply of heavy pasteboard, or binder's board, will be found of great value for making splints. It may be cut into strips eighteen inches long and six wide; there should also be a dozen or more pieces of twice this width, for making angular arm-splints. Paper of any kind, but the stouter the better, folded to give it sufficient firmness, may be substituted in many cases, when pasteboard cannot be had. Wide straps of thick leather, or even strips of the bark of certain trees, will often answer.

The pasteboard, first softened in hot water, is moulded to the injured part, and confined in its place by means either of bandages or of adhesive plaster. Cold water will soften it, but not so well as hot; it may be bent without either, but is not then very manageable, and moreover is apt to break.

Bandages ought never to be applied directly to a fractured limb at first, except in special cases, as for instance when the patella or the olecranon is the seat of injury. This rule is particularly imperative where the surgeon is obliged to send the patient away from his immediate oversight, since irreparable mischief from constriction of the swollen limb may have ensued before it is examined by another medical officer.

Splints should never be too small. If flat, they should be wider than the broken limb, so that a triangular space is necessarily left between the splint and the bandage on either side of the limb. In recent cases, where swelling is to be looked for, this is a matter of importance. Shaped splints should never surround the limb more than one-third, and there should always be a layer of some yielding substance, such as cotton batting or folded flannel, tow, or bags stuffed with bran, chaff, sand, sawdust, dried leaves, or fine hay, between any splint and the skin.

Splints should never be too short. The whole of the broken bone needs support, and in order to this the joints at either end must be secured as far as possible at perfect rest. Nothing is more essential to safety and comfort during transportation than attention to this point; and the only safe rule is to aim at supporting the entire limb.

Wooden splints are somewhat less easily attainable in military than in civil practice. If flat, they may be made to fit better by conforming their outlines to those of the injured limb; it is sometimes well also to cut holes, with carefully rounded edges, for the reception of bony prominences, such as the condyles of the humerus. Tin splints are highly spoken of by some authors; the only disadvantage they have is that they cannot be so accurately adapted to the part as pasteboard, unless the sheets are selected especially on account of their thinness, and then they would be apt not to be firm enough.

An excellent plan for putting up fractures of the extremities, in an emergency, may almost always be adopted; it is only strange that it is so little known. This is to take a bundle of straw, the stiffer the better, (wheat straw is the best,) and to enclose the limb in it, the component straws lying parallel to the axis of the limb. The latter and its envelope may then be bound round with wisps of straw, strings, bandages, or any convenient article, care being taken not to compress the seat of fracture too strongly. Greater firmness may be given by inserting two or more sticks among the straws at either side of the limb. Should swelling now occur, the dressing will yield, the straws being simply drawn out in the direction of their length. The state of the parts may be readily watched; hæmorrhage will be at once manifest; and when the dressing is to be removed, we have only to loosen the circular bands. Extension and counter-extension may be made in various ways, upon a limb thus done up. When suitable straw is not to be had, hay, the stems of bushes, corn-stalks

or leaves, cane-stalks, twigs, or small sticks may be substituted. Almost any fracture of the extremities can be thus arranged so as to be comfortable, even if the patient has to be transported some distance. And in those rare cases in which the bones of the trunk are broken, either on the march or in the field, the whole body may be encased in the same way, a much larger bulk of straw being of course required.

In some countries, the custom prevails of placing broken limbs in a mould of wet clay, which dries into a very solid case. This might be resorted to temporarily, in the absence of all other appliances, but has the disadvantages of weight and liability to crack.

Wire has of late years been extensively employed for the construction of splints. It may be provided in the form of a fine net-work, in rolls, to be cut in the figure wanted for use; or coarse wire may be carried in coils, pieces being cut off and bent into shape when required. The latter is generally made into a frame, on the under side of which the limb is, as it were, suspended in the turns of a bandage.

At a somewhat advanced stage of the treatment, the danger of swelling is past, and the patient is usually placed under more favorable circumstances for the employment of the immovable apparatus, in some one of its forms. The best of these is perhaps the plaster of Paris splint or bandage; the splint being made by dipping coarse old washed muslin, previously cut and folded to the proper shape, in plaster mixed with cold or hot water, and the bandage by rubbing in dry plaster into the meshes of an ordinary roller, which is moistened as it is applied. None but the best finely ground plaster should be used; its setting or hardening is quickened by the addition of a little salt, delayed by that of a few drops of mucilage. Some surgeons apply the plaster to the naked skin, previously greased. Another form of moulded splint may be made by folding old flannel, and saturating the outer thickness of it with shellac or varnish of some kind. Felt is used by many surgeons in preference to any other material for making splints. Starched and dextrinated bandages have fallen somewhat into disuse of late years, the slowness with which they harden rendering them particularly unsuitable for employment in military practice.

We decidedly recommend immediate reduction whenever it is at all practicable. It is not true that the parts remain wholly inactive for eight or ten days, for swelling occurs by effusion of lymph and congestion, and the muscles shorten; so that it may be extremely difficult at the end of that time to bring the fragments into place.

In all cases of doubtful diagnosis, as when the injury is near the hip-joint, it is better to etherize the patient thoroughly, so as to relax the muscles, and render the examination of the part not only less painful, but more satisfactory to the surgeon.

COMPOUND FRACTURES.

The compound fractures met with by the army surgeon are in a very large majority of cases the result of gunshot; and the improvements in modern fire-arms have given these injuries a much more uniformly serious character than they formerly had. It is very seldom the case now that a ball touches a bone without shattering it; and this does not involve the necessity of a large wound of either the skin or the periosteum,—a fact which modifies not only the diagnosis, but the course and prognosis of gunshot fractures.

When amputation is not at once called for, (a matter elsewhere discussed—see Documents F and G,) the surgeon's great object should be *to change the compound fracture into a simple one.*

Hence *the wound must be cleansed* of all dirt, foreign bodies, balls, bits of clothing, or loose splinters of bone. With regard to these latter, all the best authorities, Malgaigne, Baudens, Macleod, Bryant, Longmore, agree that they ought to be diligently sought for and removed. Dupuytren classified them into—

1. Primary, completely detached by the injury itself.
2. Secondary, so slightly retained by periosteum as to become loose when inflammation is set up.
3. Tertiary, liable to subsequent necrosis.

The latter, from their size, shape, or situation, may have to be left in place for a time; the two former should always be extracted as early as possible. The surgeon must use his best judgment in distinguishing between the different forms of splinters.

Hæmorrhage should be completely checked, by the ligation of the main artery of the limb, if it cannot be done otherwise.

Resection of the ends of the fragments is sometimes necessary, when they project through the wound, or have forced their way through the skin, and cannot be reduced. The sawing should be done obliquely, and in such a way as to favor the accurate fitting together of the cut surfaces. Much trouble from spasm and tension of the muscles is thus obviated, especially when the patient has to undergo transportation.

Sutures can only be used in very rare cases, when the wound is a large and clean one; and they should always be amply supported, unless the patient can be kept under the surgeon's eye, by adhesive strips.

Bandages ought never to be applied to compound fractures on the field; the best plan is to put the part up in a bundle of straw, with or without extension, or to fasten it to a splint of some kind with broad adhesive strips. In the later stages of the treatment, when there is less hurry, and more conveniences are at hand, the bandage of Scultetus may often be

usefully employed; it consists of strips of muslin, whose length is about one-third more than the circumference of the limb, laid so as to overlap one another by about one-third, and then brought up so as to surround the part. The chief use of this is to make slight compression, and to retain dressings; it has the advantage that any of its constituent strips, when soiled, may be easily withdrawn, a fresh strip being pinned to one end of the soiled one so as to be put in place at once without disturbing the limb.

Extension is always a matter of more or less importance, and sometimes suffices of itself to keep a broken limb in comfort. It is easily made with adhesive plaster, a handkerchief, a wisp of straw, or a piece of bandage. Sometimes it is well to recollect that the patient's boot or shoe need not of necessity be taken off in order to apply the extending band. Counter-extension may be made by handkerchiefs or any other convenient means. When the patient must undergo transportation, it is almost always better to fasten the extending and counter-extending bands to fixed points in the litter or bed, or on the floor of the wagon; pegs being driven for this purpose if necessary.

There is, however, one case in which continued extension may do harm, if made too powerfully; it is when a considerable loss of the substance of the bone has occurred, so that the fragments need rather to be held together than to be drawn apart.

The *dressings* most suitable in these cases are composed merely of lint or soft old rags wet with cold water, lightly confined in place. If the surgeon has to send the patient away from his constant oversight, warm-water dressings, covered with oiled silk, or some other impervious material, are likely to be comfortable for a much longer time than cold, which require moistening as evaporation takes place.

Ice or ice-cold water has been highly spoken of, particularly by Prof. Esmarch, of Kiel, as a local application in compound fractures as well as in other injuries. A trial of it is recommended.

When suppuration is set up, the surgeon must provide some means of soaking up the discharge—and there is nothing better for this purpose than ordinary bran. It was, indeed, proposed by Dr. J. R. Barton to dress compound fractures simply by embedding them and covering them over with bran.

A very annoying and disgusting circumstance, which sometimes takes place in compound fractures, is the development of maggots in the wound. This can only be prevented by keeping the part covered so that flies cannot get at it to lay their eggs. The maggots can be destroyed by lye-washes, or by diluted solution of chlorinated soda.

Fractures of the Lower Jaw.—These are best treated by means of the bandage described by Dr. Barton, and known by his name. (See cut.) Another and simpler plan is to slit up a bandage, 3 inches wide and a yard in length, from either end to within 3 inches of the centre; which being applied over the jaw, the two tails on either side are crossed over one another, and the corresponding ones tied at the top and back of the head respectively. A cap of paste-board, folded paper, or even plaster of Paris, should first be fitted to the chin. If time permit, the coaptation of the fragments may be further ensured by enclosing the teeth adjoining the injury in a loop of fine wire, tightened by twisting its free ends together. The extraction of a tooth is seldom if ever necessary to enable the patient to take food.

Fractures of the Clavicle.—In these we must often be content with simply suspending the arm in a sling, made or folded into a triangular shape, the apex being pinned or sewed up so as to bring the elbow as far as possible across the front of the chest. The best bandage is Velpeau's, particularly when the patient has to be transported; it is so little known in this country that a description of it may be useful. The hand of the injured side being brought up so as to rest upon the sound shoulder, a roller 2½ inches in width is applied, beginning in the sound axilla, passing across the back to the injured shoulder, down in front of the arm, under the elbow, up behind, and over the shoulder, and down across the front of the chest to the original point of starting. This having been several times repeated, turns of the bandage are made horizontally around the body and the arm of the injured side, from below upward, until only the hand and the tip of the shoulder are left uncovered. The arm is thus bound to the trunk, and the whole is secured by inserting pins wherever the turns of the bandage cross one another.

Whenever it is practicable to place the patient permanently on his back, the deformity in fractures of the collar-bone will be found much lessened, or almost entirely corrected.

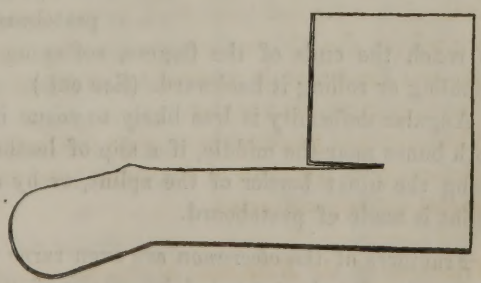
Fractures of the Ribs and Sternum.—These call simply for pressure on the walls of the chest; which may be made either by applying broad strips of adhesive plaster, *first stretched*, covering in the point of injury

and several inches on every side of it, by surrounding the chest with firm turns of a broad bandage, or by any other constricting means which may be at hand. Compresses judiciously arranged are sometimes of great use in bringing the pressure to bear upon the exact points needing it.

Fractures of the Humerus must be differently treated according to the point at which the bone may have been broken. But it must always be remembered that from the form of the limb the leverage on the fragments is very great, so that the whole member must be well supported. Shortening must be carefully obviated when the line of division is oblique.

Angular splints of wood or pasteboard answer the end best; if these cannot be obtained, a mould of clay or of plaster of Paris may be used, or the straw previously described, as a temporary resource.

In making an angular splint, the part intended for the upper arm should be left at least 10 or 12 inches long, so as to reach completely up into the axilla. When the fracture is very high up, the splint being cut to fit the inside of the arm and forearm, the elbow being at a right angle, a pasteboard cap should be adapted to the shoulder and upper half of the arm; and then, the limb being bound to the splint, the cap should be fixed in place by figure-of-8 turns around it, the body, and the axilla. The object of this is to confine the scapula, and through it the upper fragment. When the shaft is broken at any point in its length, either an inside or an anterior angular splint may be used, one, two or three short pieces being placed on the arm so as to confine it still more closely. If the seat of fracture is low down, close to the condyles, or involving one or both of them, any lateral splint is apt to press the lower fragment out of place; and hence an anterior angular splint is preferred by many surgeons, its angle fitting across the bend of the elbow, and the forearm being in complete supination. But this posture is an unnatural one, and cannot be comfortably endured for any length of time. Hence it is better to combine the inside and anterior angular splints, by tacking a piece of pasteboard of the proper size and shape to the upper or arm portion of an ordinary wooden inside angular splint. Or, cutting out the whole from one piece of pasteboard, we may follow the outline of the inside angular splint, but make the upper portion, above the angle, a little more than twice as wide as usual; and then, cutting a slit half way across it, continuous with the upper edge of the forearm part, we have a portion which

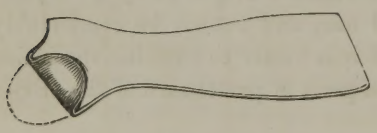


may be bent over so as to fit the front of the arm. (See cut.) All these inside angular splints should have the part corresponding to the hand cut at an obtuse angle with that for the forearm, so that the hand may be inclined toward its ulnar border; this will add greatly to the patient's comfort.

It is easy to see how the same purpose could be answered with a piece of stout wire, bent so as to form a frame for the limb, well wrapped in bandage, and secured like any other splint.

Extension and counter-extension, when a strong tendency to shortening exists, may be best made by means of a separate splint, applied first of all, and reaching along the back of the arm from above the shoulder to below the elbow, bands of adhesive plaster being passed beneath the axilla to its upper end, and over the bend of the elbow to its lower.

Fractures of the Forearm.—The bones of the forearm are exactly on a plane with one another when the hand is in the semiprone posture, and at the same time none of the muscles are put upon the stretch; this is therefore the proper position to be given to the hand in all cases of fracture of the upper extremity. It is most effectually secured by means of an inside angular splint, similar to that for fracture of the humerus; the upper or arm part of such a splint not only preventing rotation of the hand, but serving to increase the steadiness of the broken bones. Narrow compresses, so arranged as to preserve the interosseous space, ought always to be employed. The forearm part of this splint may be made on the principle of that known by the name of its inventor, Dr. Bond; its edges being cut to correspond with the outline of the forearm, and a block, a wad of paper, a mass of clay, plaster or wax, or a pad of tow, arranged so as to be grasped in the palm of the hand. If this block or pad is too large, it will simply bend the wrist backward. The same purpose may be answered, if the splint is made of pasteboard, by cutting it long enough to reach the ends of the fingers, softening its end in water, and then doubling or rolling it backward. (See cut.)



Angular deformity is less likely to ensue in fractures of the ulna or of both bones near the middle, if a slip of leather or of pasteboard is tacked along the ulnar border of the splint, or by turning up this border if the splint is made of pasteboard.

Fractures of the *olecranon* are even rarer in military than in civil surgery; they are best treated by means of an anterior pasteboard splint, bent very slightly, and adhesive plaster directly applied so as to keep the fragment as nearly in place as possible.

For fractures of the *metacarpal bones* or *phalanges*, a hand-splint should be used, with a block or pad as described above. In many cases, it is sufficient to close the hand over a ball of the proper size, securing it so by means of adhesive plaster.

Fractures of the *lower extremities* are especially difficult of management, on account of the size and weight of the parts involved, and the consequent trouble in fixing the fragments so as to prevent their rubbing against one another or tearing the adjacent soft tissues.

In the *thigh*, the bone being single and comparatively small, the muscles powerful, and the leverage on the lower fragment great, it is very generally necessary to use some extending force from the outset.

Sometimes, on the march or in the field, we must be content with the straw-splint described in Section I; but if possible, some form of extension should be added to this. Thus a board of proper length may be placed along the outer side of the limb, and a handkerchief folded cravat-wise passed around the perineum and tied to its upper end, while the foot is secured below in like manner. The extending band may in such a case be tied over the shoe or boot. Or the board may be placed along the inner side of the limb, its upper end carefully padded, bearing against the perineum.

Another plan, when the patient is to be transported in a vehicle, is to drive pegs into the floor of it at points corresponding with the axillæ, and others a few inches beyond the soles of the feet; these pegs being long and strong enough to serve as points of attachment, the upper ones for the shoulders, the lower ones for the feet, by means of wisps of straw, handkerchiefs, bandages, or adhesive strips. (See cut.) Other pegs may be driven so as to be conveniently grasped by the hands of the patient. Whatever material is used for him to lie on, should be laid as evenly as possible; and the injured limb should be carefully and firmly wrapped in its own bundle of straw.

When time permits, and a few boards can be had, a very good plan is to have a box knocked together, consisting of a bottom and two sides. The outer side should be long enough to reach from 4 inches

below the foot to the axilla, the inner one from the same point to the perineum; the bottom, smoothly bevelled off above at its upper edge, should reach from the tuber ischii as far down as the other two. Counter-extension may be made from the perineum as in the ordinary Physick's apparatus, extension by any convenient band fastened to a peg driven either between the two sides, which is best, or vertically into the bottom of the box at its lower end. Straw, hay, sand, bran, cotton, tow, or even leaves, may be used to embed the limb and prevent its contact with the wood.

In hospital, as a matter of course, the treatment may be as a general rule carried on much as in civil practice. Desault's apparatus, as modified by Physick, is widely and favorably known. Counter-extension may be made either with the stuffed tube of buckskin or muslin, the perineum being daily washed with whiskey, and *carefully dried before the band is reapplied*, or by means of adhesive plaster when an abundance of this material is at hand.

With regard to the extension, this is best made with adhesive plaster, in the following way: A strip 2 inches wide, and twice as long as from the seat of fracture to 3 inches below the sole of the foot, is stretched as much as possible. A bit of thin wood, 2 inches square, is next fitted to the middle of its adhesive surface, and on either side of this a small slit is cut lengthwise in the plaster. Through these two slits a strip of bandage is passed, so that the bit of wood is between the two strips. The adhesive band being now applied up along each side of the limb, and fixed by two or three transverse or circular strips of plaster, it will be found that strong extension may be made by pulling on the two ends of the bandage, and may be rendered permanent by tying them to the lower part of the outside splint. During the early stages of the treatment, while the muscles are apt to contract spasmodically, it is well to insert in some way a piece of elastic material, which will yield somewhat, resuming its tension the moment the spasm subsides.

Some surgeons, among whom is Dr. Buck, of New York, discard the long splint for fractures of the thigh, making counter-extension from the head of the bed, and extension by a weight attached to the foot and hanging at the foot of the bed. From 15 to 30 pounds will be requisite for a man of average muscular development.

Short splints should always be employed when the long splints are omitted. They may be confined in place by means of circular bands of adhesive plaster, or by the upper turns of a roller which begins at the toes. If the long splints of Physick are used, they should be just wide enough to prevent the circular strips of bandage from bearing upon the skin of the limb; they should each be lined, if possible, with a piece of old blanket, folded in four or five thicknesses. When this cannot be had,

cotton, linen or tow may be substituted for it, or bran bags may be used. A splint-cloth is useless, the same purpose being much better served by giving each of the circular strips of bandage a turn around each splint, enclosing also the lining, which is thus kept in place. Some sort of old stuff, woollen if possible, should be folded so as to form a protection to the whole under surface of the limb. The circular strips of bandage will be sure to stretch somewhat during the first 24 or 48 hours; after that they may be made more secure by tacking them to the edges of the splints.

Various forms of inclined planes have been described for the treatment of fracture of the thigh. The single inclined plane may be very usefully employed, with careful watching by the surgeon; it is made by fastening a board, as long as from the tuber ischii to an inch or two beyond the heel, and inclined at such an angle as may be judged suitable to an upright board, so that the latter shall project about a foot above the upper end of the former. Holes are bored in this projecting part, through which the extending bands pass to be tied, and the injured limb lies upon the slope, the weight of the body making the counter-extension.

The double inclined plane is well known; its most recent and approved form is that given to it by Dr. N. R. Smith, of Baltimore.

Dr. Smith's splint consists in a rectangular frame of stout iron wire, about 3 inches wide at one end, and $2\frac{1}{2}$ or $2\frac{3}{4}$ at the other; it is intended to reach from a little above the spine of the ilium to a point just beyond the toes, and should, therefore, be about 3 feet 8 inches long for a man of ordinary stature. Cross-pieces of wire are firmly clinched to the side-pieces at intervals of about 8 inches. There are also two double hooks of wire, each of which is adapted to clip the side-wires firmly, and has a loop above like a figure of 8, forming an eye for the attachment of a suspending cord. A small pulley and a tent-block are useful, but not indispensable to the apparatus. When the splint is to be applied, it is bent so as to correspond with the front of the limb when the hip, knee, and ankle are somewhat flexed; it is then wrapped in the turns of a bandage, and the limb bound to its under surface. The double hooks are now made to catch the splint at about the middle of the thigh and leg, and a cord attached to both; to the middle of this cord is tied the end of another, rove through the tent-block and passing over the pulley, which is fastened to the ceiling. Extension is made in proportion to the degree of slant assumed by this latter cord when the limb is thus suspended; the weight of the body is the counter-extending force. If the extension is not made properly, or if the splint presses too much or too little above or below, the points of attachment of the suspending cord should be changed; and the efficiency of the apparatus may be enhanced by raising the foot of the bed with blocks.

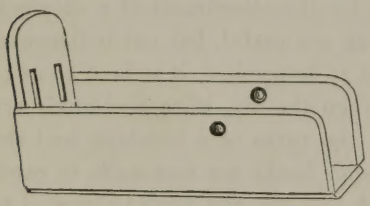
Sometimes, when the bone is broken obliquely and high up, it may be necessary to use the inclined plane in order to bring the lower fragment

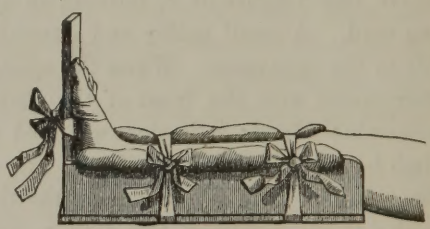
into proper relation with the upper, tilted upward by the action of the psoas and iliacus muscles.

At a late stage in the treatment, union having duly taken place, and the callus merely needing support, some form of the immovable apparatus may be found useful.

Fractures of the patella occur very rarely in army practice. When longitudinal, the only treatment they need is confinement of the limb and the subduing of inflammation. When transverse or oblique, it is necessary to fix the fragments, which may be done with strips of adhesive plaster applied above and below, a splint being placed behind the knee to prevent anything like flexion. Another plan, described by Dr. Sanborn, is to apply a roller from the toes to the trunk; before covering the knee with this bandage, a strip of adhesive plaster is laid lengthwise down the front of the lower part of the thigh and upper part of the leg, and fastened by turns of the bandage or by other strips, its middle part being, however, left uncovered. A hard compress is now placed under this loop of adhesive plaster, above the upper fragment, and by pinching up the loop and twisting it with a piece of stick, the fragments will be pushed together.

Fractures of the bones of the leg are extremely troublesome when they occur on the march. The same means may be used in these cases as when the thigh is the seat of injury,—straw splints, temporary extension, a fracture-box, as circumstances may allow. Support should be given to the whole limb, from heel to hip, and the foot should be carefully secured from falling either inward or outward.





The ordinary fracture-box, having a bottom, two sides, (fastened to the bottom by hinges of leather or iron, if possible,) and an end, the latter projecting up high enough to keep the bedclothes from weighing on the toes, may be stuffed with straw, or a pillow laid lengthwise in it, and serves as well or better than any other arrangement for the transportation of the patient. (See cut.) Extension and counter-extension can be readily made in such a box, in a manner which will suggest itself, when shortening is present; adhesive plaster is the best material for the purpose.

Wire splints may be adapted to the leg, as to the thigh; and any form

of apparatus that is used will be made more tolerable by the suspension of the entire limb. It is better in these cases, in fitting the wire splint, to make the angle at the knee more obtuse than for a fracture of the thigh, and always to hang the limb in such a way that the broken bones may be horizontal.

Should lateral angular deformity occur after fracture of the leg, it must be corrected by a careful adaptation of Dupuytren's plan, by binding the limb to a lateral splint, with a wedge-shaped compress arranged so as to bear against the projecting angle.

When, at an advanced stage of the treatment of fractures of the leg, pasteboard splints are used, they should always be applied to the sides of the limb; never to its posterior surface.

Fractures of the tarsal and metatarsal bones, as seen in military practice, are very apt not only to be compound, but to require amputation. In favorable cases, inflammation being subdued, a pasteboard splint should be accurately fitted to the front of the leg and back of the foot. When a fracture-box, like that recommended for the leg, can be had, it will ensure greater comfort to the patient, especially if he has to be moved any distance.

JOHN H. PACKARD, *Chairman.*
GEORGE W. NORRIS.
GURDON BUCK.
W. H. VAN BUREN.
WM. A. HAMMOND.
EDW. HARTSHORNE.